

In the claims:

1-47. (Cancelled)

48. (new) An apparatus able to analyze two dimensional arrays of samples on a sample substrate comprising:

- a support configured to hold a sample substrate;
- a broad spectrum excitation light source producing an excitation light beam positioned such that said excitation light beam is directed onto a sample substrate on said support;
- an excitation filter device holding a plurality of excitation filters allowing each of said excitation filters to be selectively moved into the pathway of the excitation light to select an excitation wavelength;
- a lens positioned to collect emitted light from said two dimensional array of samples on said sample substrate;
- an emission filter device holding a plurality of emission filters allowing each of said emission filters to be selectively moved into the pathway of the collected emission light; and
- a CCD detector array positioned to collect light from said lens, said collected light having passed through said emission filter.

49. (new) The apparatus of claim 48, further including an internal housing that optically isolates said CCD detector from excitation light and ambient light while optically transmitting said light passing though said emission filter.

50. (new) The apparatus of claim 49, further including a main housing for said apparatus that optically isolates all the elements of said apparatus from ambient light.

51. (new) The apparatus of claim 48, wherein said CCD detector array and said lens are able to resolve spatial features smaller than a single spot size in order to oversample spots on said two dimensional array.

52. (new) The apparatus of claim 49, further including a camera housing holding said CCD detector, the camera housing positioned to couple the main housing with the CCD detector.

53. (new) The apparatus of claim 52, wherein the camera housing holds the emission filter device.

54. (new) The apparatus of claim 48, wherein said excitation filter device and said emission filter device are automated devices allowing mechanical selection of a selected excitation filter and emission filter.

55. (new) The apparatus of claim 48, wherein the support is a drawer structure.

56. (new) An apparatus able to analyze two dimensional arrays of samples on a biochip comprising:

 a biochip support;

 a broad spectrum excitation light source producing an excitation light beam positioned such that said excitation light beam is directed onto a sample substrate on said biochip support;

 an excitation filter device holding a plurality of excitation filters allowing each of said excitation filters to be selectively moved into the pathway of the excitation light to select an excitation wavelength;

 a lens positioned to collect emitted light from said biochip;

 an emission filter device holding a plurality of emission filters allowing each of said emission filters to be selectively moved into the pathway of the collected emission light; and

 a CCD detector array positioned to collect light emitted from said biochip;

 wherein said biochip support position, lens position, and CCD are configured such that individual sample spots on said two dimensional arrays of samples are imaged onto said CCD array such that said sample spots are oversampled by said array.

57. (new) The apparatus of claim 56, wherein said samples are detected by 8 to 9 pixels.

58. (new) The apparatus of claim 56, further including a main housing that optically isolates said biochip support.

59. (new) The apparatus of claim 58, further including a camera housing holding said CCD detector, the camera housing positioned to couple the main housing with the CCD detector.

60. (new) The apparatus of claim 59, wherein the camera housing holds the emission filter device.

61. (new) The apparatus of claim 56, wherein said excitation filter device and said emission filter device are automated devices allowing mechanical selection of a selected excitation filter and emission filter.

62. (new) The apparatus of claim 56, wherein the biochip support is a drawer structure.

63. (new) An apparatus able to analyze two dimensional arrays of samples on a sample substrate comprising:

 a support configured to hold a sample substrate;
 a broad spectrum excitation light source producing an excitation light beam positioned such that said excitation light beam is directed onto a sample substrate on said support;

 an excitation filter device holding a plurality of excitation filters allowing each of said excitation filters to be selectively moved into the pathway of the excitation light to select an excitation wavelength;

 a lens positioned to collect emitted light from said two dimensional array of samples on said sample substrate;

 an emission filter device holding a plurality of emission filters allowing each of said emission filters to be selectively moved into the pathway of the collected emission light; and

 a two dimensional array detector positioned to collect light from said lens, said collected light having passed through said emission filter.

64. (new) The apparatus of claim 63, further including an internal housing that optically isolates said two dimensional array detector from excitation light and ambient light while optically transmitting said light passing though said emission filter.

65. (new) The apparatus of claim 63, further including a main housing for said apparatus that optically isolates all the elements of said apparatus from ambient light.

66. (new) The apparatus of claim 63, wherein said two dimensional array detector and said lens are able to resolve spatial features smaller than a single spot size in order to oversample spots on said two dimensional array.

67. (new) The apparatus of claim 64, further including a camera housing holding said detector, the camera housing positioned to couple the main housing with the detector.

68. (new) The apparatus of claim 67, wherein the camera housing holds the emission filter device.

69. (new) The apparatus of claim 63, wherein said excitation filter device and said emission filter device are automated devices allowing mechanical selection of a selected excitation filter and emission filter.

70. (new) The apparatus of claim 63, wherein the support is a drawer structure.